Remarks

Claims 1-21 were previously withdrawn without prejudice to renew in response to a restriction requirement. As set forth below, in response to the Office Action mailed on November 17, 2005, applicants have amended claims 22, 23 and 25, and applicants withdraw claims 24, 28 and 29 without prejudice to renew. Accordingly, claims 22-23 and 25-27 are now pending.

In the November 17, 2005 Office Action, the Examiner reiterated the rejection of claims 22, 23 and 25-27 stand rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Meyer et al., U.S. Patent No. 5,118,434, the rejection of claims 22, 23 and 25-27 under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Maes et al., U.S. Patent No. 5,366,651, and the rejection of claims 22-29 under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Hansen, U.S. Patent No. 4,728,452.

Claims 22, 23 and 25 have been amended to recite that the method of the present invention requires the addition to a fluid containing ethylene glycol of a second glycol that acts as the alcohol dehydrogenase (ADH) enzyme inhibitor to achieve a concentration of the second glycol of at least 1% by weight of the sum of the weight of the ethylene glycol fraction and the weight of the second glycol fraction of the resulting mixture. Claims 26 and 27 recite an embodiment of the method in which the second glycol is propylene glycol.

As recited in claims 22-23 and 25-27 as amended, the present invention is directed to methods of reducing the oral toxicity of fluids containing ethylene glycol by mixing a second glycol, such as propylene glycol, that acts as an ADH enzyme inhibitor with a fluid containing ethylene glycol to reduce the oral toxicity of the fluid. As recited

in the claims, the second glycol must be provided in an amount such that the concentration of the second glycol in the fluid is equal to at least one percent by weight of the sum of the ethylene glycol and the second glycol. Claims 26 and 27 recite specific ranges of propylene glycol which may be mixed with the ethylene glycol to reduce the oral toxicity of the ethylene glycol containing fluids.

As set forth in the specification at, inter alia, pages 17-21, the inventors discovered that addition of a second glycol that acts as an alcohol dehydrogenase (ADH) enzyme inhibitors, such as for example propylene glycol, to fluids containing ethylene glycol, such as for example heat transfer fluids used in automobiles, unexpectedly reduced the oral toxicity of the ethylene glycol based fluids below the levels which would have been predicted based on the toxicity of each substance alone. Ethylene glycol is commonly used in heat transfer fluids containing water to reduce the freezing point of the fluid. Ethylene glycol is relatively inexpensive. However, ethylene glycol has an oral toxicity rating that is relatively high. As set forth in the specification, addition of as little as 1% by weight of a second glycol that acts as an ADH enzyme inhibitor, such as propylene glycol, can reduce the oral toxicity of the resulting fluid to the point where it is considered non-toxic. The method of the present invention results in the reduction in the oral toxicity of ethylene glycol containing heat transfer fluids.

The Examiner's rejections under 35 U.S.C. § 102(b) and § 103(a) are respectfully traversed for at least the reasons set forth below, as the claims as amended are patentable over the prior art references cited by the Examiner under both 35 U.S.C. § 102(b) and 35 U.S.C. § 103.

Meyer, U.S. Patent No. 5,118,434 describes deicing solutions comprising alkylene glycols, water, corrosion inhibitors, and one or more polymeric additives. The

composition described by Meyer includes the polymeric additives to prevent precipitation of materials contained in the composition, and precipitation of materials contained in water that may be mixed with the composition. Meyer is directed to the problem of precipitates formed in deicing solutions. Meyer describes glycol-based deicing fluids which may contain from 50-99 percent alkylene glycols. Meyer lists propylene glycol and ethylene glycol among numerous substance that may be used in the deicing compositions described therein. Meyer does not describe, teach or suggest combining ethylene glycol with a second glycol in any specific proportions. Moreover, Meyer does not describe, or otherwise teach or suggest, a method to reduce the toxicity of ethylene glycol containing fluids by combining ethylene glycol and an ADH enzyme inhibitor, such as for example propylene glycol, in any specific proportions, much less in the proportions specified in the present application in claims 22-23 and 25-27.

Meyer does not anticipate claims 22-23 and 25-27 as amended. To anticipate a claim under 35 U.S.C. § 102(b), each and every element of the claimed invention must be found in a single prior art reference. MPEP § 2131. Meyer does not describe a method for reducing the oral toxicity of an ethylene glycol based heat transfer fluid by adding a second glycol as recited in claims 22-23 and 25-27 as amended. Moreover, Meyer does not describe addition of propylene glycol to an ethylene glycol containing fluid in any specific proportions, much less in the proportions recited in claims 22-23 and 25-27 as amended. Accordingly, Meyer does not recite each and every limitation set forth in the claims, and the claims as amended are patentable over Meyer under 35 U.S.C. § 102(b).

Claims 22-23 and 25-27 are also patentable over Meyer under 35 U.S.C §103. Meyer does not describe combining ethylene glycol and propylene glycol in any amount to reduce the oral toxicity of an ethylene glycol containing fluid, and Meyer clearly does

not describe combination of ethylene glycol and propylene glycol in the proportions recited in claims 22-23 and 25-27. As demonstrated by the test results set forth in the application at pages 17-21, the toxicity of compositions containing ethylene glycol and propylene glycol, and in particular in the specific proportions recited in claims 22-25 and 27-29, is unexpectedly reduced to levels that render the compositions safe to use. Where, as here, the Applicant shows that a claimed range achieves unexpected results relative to the prior art, a prima facie case of obviousness is rebutted. In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); MPEP § 2144.05. There is no teaching or suggestion in Meyer to use ethylene glycol and propylene glycol in the proportions specified, and there is no teaching or suggestion of the results unexpectedly achieved by mixing the two in the proportions recited in the amended claims.

In the November 17, 2004 Office Action at page 3, the Examiner states that the claims are not patentable because the deicing fluids described in Meyer inherently will have reduced oral toxicity. While the applicants do not admit that Meyer describes the combination suggested by the Examiner, even if Meyer is read in the manner suggested by the Examiner, Meyer does not support rejection of claims 22-23 and 25-27 based upon inherency under 35 U.S.C. §103. Inherency may not be established by probabilities or possibilities. MPEP §2112(IV). Meyer does not disclose combinations of ethylene glycol and a second glycol, and in particular does not describe the combination of ethylene glycol and propylene glycol, in the specific proportions recited in claims 22-23 and 25-27 as amended. Thus, even under the Examiner's reading of Meyer, it is merely a possibility that the deicing fluid described in Meyer might be reduced in toxicity in the manner recited in the claims. This is insufficient to support the rejection under 35 U.S.C. §103 based on an inherent disclosure.

In the November 17, 2004 Office Action, the Examiner has reiterated the rejection of claims 22-23 and 25-27 under 35 U.S.C. § 102(b) and 35 U.S.C. § 103 over Maes et. al., U.S. Patent Number 5,366,651. Maes does not anticipate claims 22-23 and 25-27 as amended. To anticipate a claim under 35 U.S.C. § 102(b), each and every element of the claimed invention must be found in a single prior art reference. MPEP § 2131. Maes does not describe a method for reducing the oral toxicity of an ethylene glycol based heat transfer fluid by adding a second glycol as recited in claims 22-23 and 25-27 as amended. Moreover, Maes does not describe addition of propylene glycol to an ethylene glycol containing fluid in any specific proportions, much less in the proportions recited in claims 22-23 and 25-27 as amended. Accordingly, Maes does not recite each and every limitation set forth in the claims, and the claims as amended are patentable over Meyer under 35 U.S.C. § 102(b).

On page 3 of the Office Action, the Examiner states that the claims are rejected based upon Maes because "a mere statement of a new use for an old or obvious composition cannot render the claims to the composition patentable." Applicants do not admit that the compositions described in the application are old or obvious, but note that, in any event, the principle stated by the Examiner does not apply to the pending claims in this case. All of the pending claims are directed to a novel method to reduce the toxicity of an ethylene glycol based heat transfer fluid by addition of a diol, such as, for example, propylene glycol, which acts as an inhibitor of ethylene glycol poisoning. Because the pending claims are not composition claims, this grounds for rejection is respectfully traversed.

The Examiner also states that the Maes reference renders obvious the use of more than one water soluble freezing point depressant in anti-freeze compositions. The Examiner states that "The reference clearly teaches that the antifreeze combinations most

commonly used include mixtures of water and water-soluble liquid alcohol freezing point depressants." No citation to Maes is provided by the Examiner for this statement.

At col. 3, line 65 to col. 4, line 68, Maes states "The antifreeze formulations most commonly used include water and water soluble liquid alcohol freezing point depressants such as glycol and glycol ethers." In this sentence, Maes uses glycol in the singular and glycol ethers in the plural, and throughout the specification, Maes describes antifreeze formulations containing a single glycol, indicating that only a single glycol is used in the formulation. Thus, Maes plainly describes the use of a single glycol, and Maes does not teach or suggest any combination of glycols, much less the combination and proportions recited in the claims. For at least this reason, in addition to the reasons set forth in Applicants' August 16, 2004 Response to Office Action in this case, applicants' maintain that Maes does not describe, teach or suggest the combination of more than one glycol freezing point depressant for any reason, much less the addition of a second glycol to a fluid containing ethylene glycol to reduce the oral toxicity of the ethylene glycol-containing fluid as recited in the methods of claims 22-23 and 25-27.

While applicants do not admit that the Examiner's reading of Maes is correct, even under the Examiner's interpretation of Maes, claims 22-23 and 25-27 are patentable under 35 U.S.C. § 103. Maes does not describe, teach or suggest a method to reduce the oral toxicity of an ethylene glycol containing fluid by addition of a second glycol, such as for example propylene glycol, that acts as an ADH enzyme inhibitor to as recited in the amended claims. Moreover, Maes does not teach or suggest combining an ethylene glycol based heat transfer fluid in any specific proportions with propylene glycol, much less in the proportions recited in claims 22-23 and 25-27 as amended. As set forth in the specification, the present inventors discovered that adding a second glycol that acts as an ADH enzyme inhibitor, such as propylene glycol, in the proportions recited in claims 22-

23 and 25-27 to an ethylene glycol based heat transfer fluid unexpectedly reduced the toxicity of the resulting fluid below the level that would have been predicted based on the properties of the individual fluids. Where, as here, a claimed range achieves unexpected results, the claimed range is patentable over the prior art. In re Woodruff, 919 F.2d 1575 (Fed. Cir. 1990); MPEP § 2144.05. Accordingly, even under the Examiner's reading of Maes, claims 22-23 and 25-27 are patentable under 35 U.S.C. § 103 for at least this reason.

On page 4 of the Office Action, the Examiner states that the rejection of claims 22-23 and 25-27 based upon Maes is supported because the reduction of oral toxicity is inherent in the anti-freeze fluids described in Maes. While the applicants do not admit that Maes describes the combination of fluids suggested by the Examiner, even if Maes is read in the manner suggested by the Examiner, Maes does not support rejection of claims 22-23 and 25-27 based upon inherency under 35 U.S.C. §103. Inherency may not be established by probabilities or possibilities. MPEP §2112(IV). Maes does not disclose combinations of ethylene glycol and a second glycol in the specific proportions recited in claims 22-23 and 25-27 as amended. Thus, even under the Examiner's reading of Maes, it is merely a possibility that the anti-freeze described in Maes might be reduced in toxicity in the manner recited in the claims. This is insufficient to support the rejection under 35 U.S.C. §103 based on an inherent disclosure.

In the November 17, 2004 Office Action, the Examiner has reiterated the rejection of claims 22-23 and 25-27 under 35 U.S.C. § 102(b) and 35 U.S.C. § 103 over Hansen, U.S. Patent No. 4,728,452. describes coolant compositions for use in aqueous coolant systems. Col. 1, lines 7-10. The compositions include water soluble corrosion inhibitors to reduce corrosion of metal surfaces in the cooling system using aqueous coolants. Col. 2, lines 24-57. Hansen states that the corrosion inhibitor composition may be used in

water alone, "or water in admixture with freezing point depressing amounts of at least one alcohol, at least one glycol or a mixture of at least one alcohol and at least one glycol" in a closed aqueous cooling system. Col. 2, lines 40-44. Hansen does not describe, teach or suggest the use of a combination of glycols for any purpose, and clearly does not describe, teach or suggest adding a second glycol, such as propylene glycol, to an ethylene glycol containing fluid to reduce the oral toxicity of the fluid as recited in claims 22-23 and 25-27.

Hansen does not anticipate claims 22-23 and 25-27 as amended. To anticipate a claim under 35 U.S.C. § 102(b), each and every element of the claimed invention must be found in a single prior art reference. MPEP § 2131. As set forth above, Hansen does not describe a method for reducing the oral toxicity of an ethylene glycol based heat transfer fluid by adding a second glycol as recited in claims 22-23 and 25-27 as amended. Moreover, Hansen does not describe addition of propylene glycol to an ethylene glycol containing fluid in any specific proportions, much less in the proportions recited in claims 22-23 and 25-27 as amended. Accordingly, Hansen does not recite each and every limitation set forth in the claims, and the claims as amended are patentable over Hansen under 35 U.S.C. § 102(b).

Claims 22-23 and 25-27 are also patentable over Hansen under 35 U.S.C. § 103. Hansen does not describe, teach or suggest combination of an ethylene glycol containing fluid with a second glycol, such as propylene glycol, in any proportions, much less in the proportions set forth in claims 22-23 and 25-27 as amended. Moreover, as demonstrated by the test results set forth in the application, the addition of a second glycol, such as propylene glycol, to fluids containing ethylene glycol in the proportions recited in the method of claims 22-23 and 25-27 as amended, unexpectedly reduced the oral toxicity of the ethylene glycol containing fluid to levels that render the fluid safe. Where, as here,

the Applicant shows that a claimed range achieves unexpected results relative to the prior art, a prima facie case of obviousness is rebutted. In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990); MPEP § 2144.05. There is no teaching or suggestion in Hansen to use ethylene glycol and a second glycol, such as propylene glycol, in any combination, much less in the proportions recited in claims 22-23 and 25-27.

On page 5 of the Office Action, the Examiner states that the rejection of claims 22-23 and 25-27 based upon Hansen is supported because the reduction of oral toxicity is inherent in the fluids described in Hansen. As set forth above, Hansen does describe the combination of two glycols in any proportion, much less in the proportions recited in claims 22-23 and 25-27. Accordingly, Hansen cannot render the claims obvious under inherency. MPEP §2112(IV).

In view of the foregoing remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes after considering these remarks, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

Because the reasons above are sufficient to traverse the rejection, Applicants have not explored, nor do they now present, other possible reasons for traversing such rejections. Nonetheless, Applicants expressly reserve the right to do so, if appropriate, in response to any future Office Action.

A Request for Continued Examination and a petition for a three month extension of time and associated fee extending the time to respond to Office Action from February 17, 2005 to May 17, 2005 has been filed herewith. No additional fee is believed to be required. However, if an additional fee is required or otherwise necessary to cover any